LETTER

FROM

THE JOINT COMMISSION FOR COMPLETION OF THE WASHINGTON MONUMENT.

TRANSMITTING

Their annual report.

DECEMBER 15, 1885.—Laid on the table and ordered to be printed.

OFFICE JOINT COMMISSION WASHINGTON MONUMENT,
Washington, D. C., December 14, 1885.

SIR: I have the honor to transmit herewith the annual report of the Joint Commission for the completion of the Washington Monument to Congress, made in compliance with the law creating the commission.

Very respectfully, your obedient servant,

W. W. CORCORAN,
Chairman Joint Commission Completion of Washington Monument.

HON. JOHN SHERMAN,
President pro tempore, U. S. Senate.

OFFICE JOINT COMMISSION WASHINGTON MONUMENT,
Washington, D. C., December 14, 1885.

To the Senate and House of Representatives:

The Joint Commission for the completion of the Washington Monument, created by the act of August 2, 1876, beg leave to report:

That the work has steadily progressed during the past year, as is more particularly set forth in the annual report of the engineer in charge, Col. Thomas Lincoln Casey, Corps of Engineers, which report was accepted by the Commission.

An appropriation of $107,000, estimated for the extension of the terrace about the Monument in every direction, and over the pond just north of the terrace, is recommended for favorable consideration.

For and on behalf of the Joint Commission:

W. W. CORCORAN,
Chairman.

ENGINEER OFFICE WASHINGTON MONUMENT,
612 SEVENTEENTH STREET,
Washington D. C., December 8, 1885.

GENERAL: I have the honor to submit the following report of operations upon the Washington Monument for the past year:

At the close of the last season the topmost stone of the walls had

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been set, substantially completing the obelisk. The work since done upon the masonry has had for its object the improvement of the appearance of the obelisk, and its protection from the destructive effects of the weather.

The nine windows in the pyramidion, which served as openings through which the staging for building the pyramidion was supported, and by means of which access to the exterior of the walls can be gained at any time, were carefully fitted with marble shutters set in bronze frames. Eight of these frames are hung upon revolving cranes, and are so contrived as not only to be readily maneuvered, but to carry the shutters into positions where their faces are protected from disfigurement or accident. When the windows are closed by these shutters the pyramidion is much improved in appearance, and the interior of the shaft is protected from storm waters, which would otherwise flow into them from the roof and flood the upper platforms.

The two original entrances to the Monument at its base, were large Egyptian doorways, 15 feet in height by 6 feet in width, each surmounted by a heavy pediment, and an entablature upon which was carved the winged ball and the asp. These doorways were in keeping with the original design of a massive temple to surround the lower part of the shaft, but being no longer appropriate, after the determination to retain the obelisk only as the Monument, the projecting jambs, entablature, and pediment were dressed down to the planes of the faces of the shaft, and the western doorway walled up with large grained marble, such as was used in facing the lower part of the walls. The eastern doorway was reduced in height to 8 feet, and was closed by two marble doors or slabs, revolving upon heavy bronze hinges, the weight of each leaf, over half a ton, being supported upon a steel friction roller.

During the year a plant for lighting the interior of the shaft with seventy-five incandescent electric lamps was introduced under a contract, dated January 27, with the United States Electric Lighting Company, of this city. The dynamo and cables of this plant are designed for one hundred and twenty-five lamps, which number at some future day may be required. From the floor to a height of 200 feet there are two lights to each platform, and from 200 feet to 480 feet there is but one light to each platform.

As soon as the appropriation of March 3, 1885, was available, drawings were prepared for the metal work needed to complete the treads, platform coverings, hand-rails of the stairs, and the screens and doors of the elevator well. A contract for this work was signed on the 6th of May, with The Snead and Company Iron Works, of Louisville, Ky., and at the date of this report the metal work is going on rapidly. Owing to great difficulties encountered in rolling the steel treads of the stairs, the whole work was much delayed, and the contemplated alterations in the engine-house, boiler-house, elevator car, and floor of the Monument deferred to a later period in the year.

Of the 189 blocks of stone presented to the Monument at various times from foreign countries, States, Territories, cities and towns of the Union, societies, associations, and individuals, 92 had been built into the walls of the portion of the shaft constructed by the Washington National Monument Society.

In taking off the upper 6 feet of the old shaft, which was damaged by the weather, 8 of these stones were removed and deposited in the store-house. To insure a thorough bond in the masonry and the strongest character of ashlar construction, it was decided not to build in any more of the blocks until the completion of the obelisk. During the past

year, and under contract with Dennis O'Leary, dated June 30, 53 blocks were inserted in the walls, from platform 160 to platform 230, both inclusive. The work consisted in reducing the thicker blocks to thin slabs, cutting depressions in the faces of the walls, and securely wedging the slabs into them. Of the stones inserted during the year, 9 were from foreign countries, namely, Brazil, Bremen, China, Greece, Japan, Siam, Switzerland, Turkey, Isles of Paros and Naxos; 13 from States and Territores, namely, Kansas, Kentucky, Michigan, Minnesota, Nebraska, Nevada, Pennsylvania, Tennessee, Vermont, West Virginia, Montana, Utah, and Wyoming, a space being secured on platform 160 for a stone from the State of New York, now being prepared; 10 from cities and towns; 9 from Masonic Societies; 6 from Odd-Fellow Societies; 4 from Sons of Temperance, and 2 miscellaneous.

The remaining 51 blocks in the store-house, representing mainly local societies and organizations and individuals, have been reserved for future consideration.

A considerable amount of unexpected work was performed during the season in the erection of rods and points to protect the obelisk from lightning.

The lightning conductors, as established for the Monument, were commenced in January, 1880, and were finished in January, 1885. These conductors consist of the four hollow wrought-iron Phœnix columns standing in the well of the shaft, and which support the elevator machinery and guide the car. These columns are 6 inches in exterior diameter, five-eighths of an inch in thickness, and are made up of sections 20 feet in length, fastened together with long inside couplings, which fit tightly into the columns, and are fastened to them by sixteen screw-bolts. The bottoms of these four columns rest upon and are bolted to cast-iron shoes, which in turn stand upon the floor of the large drum-pit beneath the floor of the Monument. The shoes are connected to three-quarter inch soft copper rods led to the bottom of a well in the center of the foundation. This well is 32 feet 10 inches in depth below the bottom of the drum-pit, and 15 feet 8 inches below the bottom of the masonry foundation, and the water stands in it permanently 2 feet 8 inches above its bottom. After the copper rods were inserted the well was filled with clean sharp sand for a depth of 15 feet 8 inches, or up to the level of the bottom of the old rubble-stone foundation of the Monument. These four columns so arranged at their bases, and always projecting above the top of the shaft, were continually lengthened as the building of the shaft progressed, and for the five summers during which the masonry was in progress acted as the lightning conductors of the edifice. No disruptive discharge of electricity was experienced during those five years.

When the walls were completed, in December of 1884, and the upper extremities of the columns were covered in by the marble pyramidion, four copper rods, three quarters of an inch in diameter, were run, one from each column, to the top stone, and there united in a 1½ inch copper rod, which, passing vertically through the stone, was screwed into a solid metal terminal of aluminium. This metal was selected for the terminal because of its whiteness, and the probability that its polished surfaces would not tarnish upon exposure to the air. It was a square pyramid in shape, similar to the pyramidion of the obelisk, and, fitting upon the top stone, completed the apex. This terminal weighed 100 ounces, and was 8.9+ inches in height and 5.6+ inches in width at the base. The angle at the vertex between two opposite sides was about 34° 48′.

The conductors, as above described, when tested gave an electrical resistance of one-tenth of an ohm from the tip of the terminal to the copper rods at the base, and two and two-tenths ohms for the ground connections, making a total resistance of two and three-tenths ohms for the conductor. The system was entirely completed and connected on January 20, 1885.

On the 5th of April, 1885, during the passage of a heavy thunder cloud over the monument, at least five immense sparks or bolts of electrical light were seen within a period of twenty minutes to flash between the terminal and the cloud, without audible sound to the observers. A careful examination of the conductors and shaft after this phenomena failed to reveal any effects from these discharges.

On the 8th of June, however, during a thunder storm, a disruptive discharge was seen to pass between the summit of the pyramidion and the cloud. Upon examining the structure, a crack was discovered in the stone on the north face of the pyramidion just under the top stone, extending through the block in a line nearly parallel to the northeast corner, and about 8½ inches from it. The fragment was pressed outwards about three-quarters of an inch at its bottom, chipping a s mall piece off the lower corner of the top stone into which it was locked, and was easily forced back to place, and bolted to the solid stone from which it had been torn.

Under the circumstances of this damage, and to devise if possible some plan by which the obelisk could be more effectually protected from lightning, Professors H. A. Rowland, of the Johns Hopkins University, Simon Newcomb, of the United States Navy, and T. C. Mendenhall, of the United States Signal Service, were invited to inspect the conductors and recommend any modifications in them which, in their judgment, would be proper for the end required. This they kindly consented to do, and after a careful examination recommended in substance, that the interior conductors should be connected with a system of rods and a greater number of points, to be located upon the exterior of the pyramidion. The additions, as devised by them, consist of four one-half-inch copper rods, fastened by a band to the aluminium terminal and led down the corners to the base of the pyramidion; thence, passing through the masonry, they extend inward, and are joined to the iron columns above described. As these exterior rods are each over 60 feet long, they are also connected at two intermediate points of their lengths with the iron columns by means of copper rods one-half and three-quarters of an inch in diameter, respectively, furnishing sixteen rods in all connecting the exterior system of conductors with the interior conducting columns. Where the exterior rods upon the corners cross the eleven highest horizontal joints of the masonry of the pyramidion, they are connected to each other all around by other copper rods sunk into those joints. All of these exterior rods, couplings, and fittings are gold plated, and are studded at every 5 feet of their lengths with copper points 3 inches in length, gold plated and tipped with platinum. There are two hundred of these points in all.

A contract for erecting a permanent boiler-house was made on October 22, with William Bradley, of this city, and the work is now in progress. This boiler-house is located about 450 feet southwest of the Monument, and is designed to accommodate two boilers, and includes a coal-vault of 90 tons capacity. It is being built of the refuse granite and marble which accumulated during the construction of the Monument. The live and exhaust steam will be led to and from the engines

at the Monument through pipes located in a brick culvert beneath the glacis surrounding the obelisk.

On the 21st of February, in pursuance of the joint resolution of Congress, approved May 13, 1884, the Monument was dedicated to the name and memory of George Washington, by the President of the United States, with appropriate ceremonies. In preparing the grounds for this ceremony, it became necessary to remove the old blacksmith shop, the scaffolding carrying the rail-track running into the Monument, and the derricks, with their guy-fastenings scattered about the grounds. None of the appliances, however, were any longer needed at the work.

The following contracts were made during the year:

Date.	Materials and work contracted for.	Names and residences of contractors.	Contract price.	Present condition.
1885.				
Jan. 27	Electric light plant	United States Electric Light Company, of Washington, D. C.	$1,872 00	Completed.
May 6	Iron work for interior stairs and platforms.	Snead & Co. Iron Works, of Louisville, Ky.	20,591 00	In force.
June 15	Cut marble for doorways	Hugh Sisson, of Baltimore, Md.	1,375 00	Completed.
June 30	Inserting blocks in walls	Dennis O'Leary, of Washington.	1,825 00	Completed.
Aug. 7	Copper and gold plated lightning rods.	Ledig & Herrlein, of Philadelphia.	1,271 00	Completed.
Oct. 22	Stone boiler-house	William Bradley, of Washington.	6,994 58	In force.

Statement of expenditures for the year ending December 1, 1885.

Balance available December 1, 1884		$12,289 69
Appropriation of March 3, 1885		75,000 00
		87,289 69
Amount expended during the year for materials, tools, labor, &c		30,717 14
Amount covering existing contracts, &c		27,744 89
Balance available December 1, 1885		28,827 66

With this balance it is expected to complete the engine-house and approaches, cementing interior walls, paving of floor, alterations in elevator car, and an additional boiler with its steam connections.

In furtherance of the plan adopted by the Joint Commission last year, an appropriation of $107,000, for filling and extending the terrace in every direction and over the pond just north of the Monument, is asked for the year ending June 30, 1887.

The attention of the Joint Commission is called to the fact that the Monument is often thoughtlessly disfigured by visitors scratching and writing upon the marble surfaces, and is injured by chipping off small pieces of the stone to be carried away as mementoes. Itwould seem proper that some action should be taken to prevent these occurrences, which, if continued, may impair the stability of certain parts of the structure.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,
Colonel, Corps of Engineers, Engineer in Charge.

Brig. Gen. JOHN NEWTON,
Chief of Engineers, U. S. A., Chairman of Building Committee, Joint Commission for completion of the Washington Monument.